UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,698	08/16/2006	Jurgen Schulz-Harder	A-10148	8806

20741 7590 03/29/2010
HOFFMAN WASSON & GITLER, P.C
CRYSTAL CENTER 2, SUITE 522
2461 SOUTH CLARK STREET
ARLINGTON, VA 22202-3843

EXAMINER	
WALTERS, RYAN J	

ART UNIT	PAPER NUMBER
3726	

MAIL DATE	DELIVERY MODE
03/29/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/589,698	Applicant(s) SCHULZ-HARDER, JURGEN	
	Examiner RYAN J. WALTERS	Art Unit 3726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/16/2006*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Specification

1. **The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter.** See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claim 8 recites “a maximum oxygen content is used that amounts to approximately 300%”. However, the specification mentions “the oxygen content… is no more than 300%” (page 4). “approximately 300%” covers oxygen content amounts above 300% which is not supported by the specification.

Claim 12 recites “the joining of the plates takes place with the application of heat at a mechanic pressing force between 20 and 2500 bar”. However, the specification only describes pressing being applied during post treatment and this recitation has antecedent basis in the initial heating step where according to the specification no pressing is applied. Further, the specification does not mention any mechanic pressing force and does not mention the range of 20-2500 bar at all.

Claim 17 recites “at least one electric component is fastened to the plate stack or to the cooler formed by the plate stack, by means of brazing, and the component is a laser diode or light-emitting diode”. However, the specification only mentions “forming a cooler or heat sink 6 for cooling an electric component, for example a laser diode bar, comprising a plurality of laser emitting diodes” (page 2) but does not mention light-emitting diode, or brazing or fastening any electric components in any way and these components do not appear in the drawings.

Claim 19 recites “the plate stack or the cooler formed by said plate stack is processed on at least one surface by diamond cutting”. However, the specification does not mention diamond cutting.

Claim Objections

2. **Claim 8** is objected to because of the following informalities:

On line 2: Delete “an inert gas atmosphere,".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claims 1-19 are rejected under 35 U.S.C. 112, second paragraph**, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. **Claim 1** recites the limitation "the application" in line 7. There is insufficient antecedent basis for this limitation in the claim.

6. **Claim 4** recites the following limitations:

"a treatment temperature" in line 4 (is this different from post-treatment temperature?)

"the system" in line 5

"the joining connection" in line 6

There is insufficient antecedent basis for these limitations in the claim.

7. **Claim 5** recites the following limitations:

"a treatment temperature" in line 4 (is this different from post-treatment temperature?)

"the brazing metal" in line 5

"the joining connection" in line 6

There is insufficient antecedent basis for these limitations in the claim.

8. **Claim 6** recites the limitation "the surface sides" in line 2. There is insufficient antecedent basis for this limitation in the claim.

9. **Claim 7** recites the limitation "the melting temperature" in line 7. There is insufficient antecedent basis for this limitation in the claim.

10. **Claim 8** recites the following limitations:

"the oxygen content" in line 4

"the equilibrium oxygen partial pressure" in line 4

"the treatment temperature" in line 4

There is insufficient antecedent basis for these limitations in the claim.

11. **Claim 13** recites the limitation "the adjoining copper" in line 3. There is insufficient antecedent basis for this limitation in the claim.

12. **Claim 14** recites the limitation "the adjoining copper" in line 3. There is insufficient antecedent basis for this limitation in the claim.

13. **Claim 15** recites the limitation "the joining material" in line 3. There is insufficient antecedent basis for this limitation in the claim.

14. **Claim 16** recites the limitation "the joining material" in line 3. There is insufficient antecedent basis for this limitation in the claim.

15. **Claim 17** recites the limitation "the cooler" in line 3. There is insufficient antecedent basis for this limitation in the claim.

16. **Claim 19** recites the limitation "the cooler" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

18. Claims 1-6, 12 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fowler (US 6,068,179) in view of Hunt (US 5,836,506).

19. Re **Claim 1**, Fowler discloses a method for manufacturing plate stacks, for the production of coolers, cooler elements or heat sinks comprising at least one plate stack for cooling electric and/or opto-electric components, wherein the method comprises at least the following process steps:

manufacture of plates 12, 14, 16 or boards of metal (Col. 5, lines 38-45),

stacking of the plates to form a plate stack 10 (Col. 5, lines 38-45),

joining of the plates with the application of heat at a joining temperature (TF) and at an atmospheric pressure or in a vacuum (Col. 5, lines 42-45),

cooling of the plate stack formed by the joined plates to a temperature below the joining temperature (TF) (inherently the stack will cool to a lower temperature after heating step) and

post-treatment (HIP treatment) of the plate stack in an inert gas atmosphere at an inert gas pressure (PB), and at a post-treatment temperature (TB) (Col. 5, lines 58-67).

Fowler does not explicitly disclose that the inert gas pressure of the HIP treatment is between 200 and 2000 bar OR that the post-treatment temperature (TB) of HIP treatment is below the joining temperature (TF).

However, **Hunt** teaches an HIP post treatment step for joining two plates including inert gas pressure of the HIP treatment is between 200 and 2000 bar (Col. 7, lines 23-65) and that the post-treatment temperature (TB) is a fraction of the melting temperature (Col. 6, lines 59-67; Table 1). Note that this temperature is inherently less than the joining temperature (TF) of Fowler since welding is inherently at the melting temperature of the metal of the plates. It would be obvious to one of ordinary skill in the art to set the inert gas pressure of the HIP treatment between 200 and 2000 bar and the post-treatment temperature (TB) of HIP treatment below the joining temperature (TF), as taught by Hunt, for the purpose of creating a tight bond interface by diffusion bonding in a controlled environment with reduced risk of bond cracking due to tensile stresses.

20. Re **Claims 2-5 and 12**, as best understood, Fowler does not explicitly disclose that the inert gas pressure of the HIP treatment is between 200 and 2000 bar OR that the post-treatment temperature (TB) of HIP treatment is 95-99% of the joining temperature (TF).

However, **Hunt** teaches an HIP post treatment step for joining two plates including inert gas pressure of the HIP treatment is between 200 and 2000 bar (Col. 7, lines 23-65) and that the post-treatment temperature (TB) is a fraction of the melting temperature (Col. 6, lines 59-67; see Table 1: $0.95T_m$). Note that this temperature is inherently less than the joining temperature (TF) of Fowler since welding is inherently at

the melting temperature of the metal of the plates. It would be obvious to one of ordinary skill in the art to set the inert gas pressure of the HIP treatment between 200 and 2000 bar and the post-treatment temperature (TB) of HIP treatment to be 95-99% of the joining temperature (TF), as taught by Hunt, for the purpose of creating a tight bond interface by diffusion bonding in a controlled environment with reduced risk of bond cracking due to tensile stresses.

21. Re **Claim 6**, Fowler discloses a joining material 24 is applied at least to the surface sides of the plates to be joined (Fig. 3).

22. Re **Claim 18**, Fowler discloses a joining material 24 is applied to surfaces of at least some openings (Fig. 3).

23. Re **Claim 19**, Fowler does not explicitly disclose the plate stack or the cooler formed by said plate stack is processed on at least one surface by diamond cutting. However, diamond cutting is a well known process and it would have been obvious for one of ordinary skill in the art to perform diamond cutting, for the purpose of making a precise cut in hard metal.

24. **Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fowler (US 6,068,179) in view of Hunt (US 5,836,506), as applied to Claim 1, in further view of Woodfield (US 6,737,017).**

25. Re **Claims 8 and 9**, Fowler does not explicitly disclose that during the HIP post-treatment an inert gas atmosphere formed by argon or nitrogen with a maximum oxygen content is used that amounts to approximately 300% of the oxygen content corresponding to the equilibrium oxygen partial pressure at the treatment temperature

(TB) or that the oxygen content in the inert gas atmosphere is less than an oxygen partial pressure of 15.times.10.sup.-6 bar.

However, Fowler/Hunt disclose using argon and **Woodfield** teaches a hot isostatic pressing method including a residual oxygen content which can diffuse into and alloy with the metallic component showing that it is beneficial to have a maximum oxygen content during an HIP step (Col. 11, lines 20-25). It would be obvious to ordinary skill in the art to have a maximum oxygen content during an HIP step, as taught by Woodfield, for the purpose of achieving further alloying of a metallic article (Col. 11, line 21) and also since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

26. **Claims 1-7, 12-14 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (EP 1136782A1) in view of Beltran (US 3,904,101).**

27. Re **Claim 1**, Matsumoto discloses a method for manufacturing plate stacks, for the production of coolers, cooler elements or heat sinks comprising at least one plate stack for cooling electric and/or opto-electric components, wherein the method comprises at least the following process steps:

manufacture of plates or boards of metal 1-5 (Fig. 7),

stacking of the plates to form a plate stack (Fig. 7),

joining of the plates with the application of heat at a joining temperature (TF) and at an atmospheric pressure or in a vacuum (Col. 3, paragraph 12),

cooling of the plate stack formed by the joined plates to a temperature below the joining

temperature (TF) (inherently the stack will cool to a lower temperature after heating step)

Matsumoto does not disclose post-treatment (HIP treatment) of the plate stack in an inert gas atmosphere at an inert gas pressure (PB) between 200 and 2000 bar, and at a post-treatment temperature (TB) that is below the joining temperature (TF).

However, **Beltran** teaches a method including joining of plates with the application of heat at a joining temperature (TF) and then performing post-treatment (HIP treatment) of the plate stack in an inert gas atmosphere at an inert gas pressure (PB) between 200 and 2000 bar, and at a post-treatment temperature (TB) that is below the joining temperature (TF) (Col. 2, line 66 – Col. 3, line 40).

It would be obvious to one of ordinary skill in the art to perform post-treatment (HIP treatment) of the plate stack at a post-treatment temperature (TB) that is below the joining temperature, as taught by Beltran, for the purpose of precluding remelting of the braze alloy and disruption of seam integrity (Col. 3, line 2) and to obtain a desired bond by the interdiffusion of molecules across the interface between plates (Col. 3, line 38).

28. Re **Claims 2-5**, Matsumoto does not disclose of the plate stack is conducted in an inert gas atmosphere at a gas pressure between 200 and 2000 bar, and at a treatment temperature (TB) corresponding to approximately 95-99% of the temperature at which all components of the brazing metal forming the joining connection have solidified.

However, **Beltran** teaches post-treatment of the plate stack is conducted in an inert gas atmosphere at a gas pressure between 200 and 2000 bar, and at a treatment

temperature (TB) corresponding to approximately 95-99% of the temperature at which all components of the brazing metal forming the joining connection have solidified. (Col. 2, line 66 – Col. 4, line 5).

It would be obvious to one of ordinary skill in the art to perform post-treatment (HIP treatment) of the plate stack at a gas pressure between 200 and 2000 bar, and at a treatment temperature (TB) corresponding to approximately 95-99% of the temperature at which all components of the brazing metal forming the joining connection have solidified, as taught by Beltran, for the purpose of precluding remelting of the braze alloy and disruption of seam integrity (Col. 3, line 2) and to obtain a desired bond by the interdiffusion of molecules across the interface between plates (Col. 3, line 38).

29. Re **Claim 6**, Matsumoto discloses a joining material is applied at least to the surface sides of the plates to be joined (Col. 3, paragraph 12).

30. Re **Claim 7**, Matsumoto discloses application of a brazing metal as joining material to the plates (Col. 3, paragraph 12),

stacking of the plates to form the plate stack (Fig. 7),

heating of the plate stack at least to the melting temperature of the brazing metal (Col. 3, paragraph 12),

cooling of the plate stack to a temperature below the melting temperature of the brazing metal (inherent), and

Beltran teaches HIP post-treatment of the plate stack (Taught by Beltran, already discussed in claim 1 rejection).

31. Re **Claim 12**, as best understood, Matsumoto does not disclose the joining of the plates takes place with the application of heat at a mechanic pressing force between 20 and 2500 bar. **Beltran** teaches application of heat at a mechanic pressing force between 20 and 2500 bar (Col. 2, line 66 – Col. 4, line 5).

It would be obvious to one of ordinary skill in the art to perform application of heat at a mechanic pressing force between 20 and 2500 bar, as taught by Beltran, for the purpose of obtaining a desired bond by the interdiffusion of molecules across the interface between plates (Col. 3, line 38).

32. Re **Claim 13**, Matsumoto discloses the plates are made of copper and that silver is used as the joining material, forming together with the adjoining copper a silver-copper alloy, that in order to join the plate stack (Col. 15, paragraph 90),
the stack is heated (Col. 3, paragraph 12).

Matsumoto does not explicitly disclose heating to a temperature between 778 and 990.degree. C.. However, Matsumoto discloses heating to a temperature above the melting point of the joining material (Col. 3, paragraph 12). It would be obvious to heat in this range in order to effectively allow the joining material to bond the plates and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Matsumoto does not disclose the HIP post-treatment takes place at a pressure between 400 and 2000 bar at a post-treatment temperature of at least 252.degree. C. and no more than 767.degree. C.

However, **Beltran** teaches HIP post-treatment of the plate stack at a pressure between 400 and 2000 bar, and at a post-treatment temperature below the prior brazing temperature (Col. 2, line 66 – Col. 3, line 40).

It would be obvious to one of ordinary skill in the art to perform post-treatment (HIP treatment) of the plate stack at a gas pressure between 200 and 2000 bar, and at a post-treatment temperature below the prior brazing temperature, as taught by Beltran, for the purpose of precluding remelting of the braze alloy and disruption of seam integrity (Col. 3, line 2) and to obtain a desired bond by the interdiffusion of molecules across the interface between plates (Col. 3, line 38) and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

33. Re **Claim 14**, Matsumoto discloses the plates are made of copper and that silver is used as the joining material, forming together with the adjoining copper a silver-copper alloy, that in order to join the plate stack (Col. 15, paragraph 90),
the stack is heated (Col. 3, paragraph 12).

Matsumoto does not explicitly disclose heating to a temperature of approximately 850.degree. C. However, Matsumoto discloses heating to a temperature above the melting point of the joining material (Col. 3, paragraph 12). It would be obvious to heat in this range in order to effectively allow the joining material to bond the plates and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In*

re Aller, 105 USPQ 233.

Matsumoto does not disclose the HIP post-treatment takes place at a pressure approximately 1200 bar at a post-treatment temperature of at least 408.degree. C. and no more than 877.degree. C.

However, **Beltran** teaches HIP post-treatment of the plate stack at a pressure approximately 1200 bar, and at a post-treatment temperature below the prior brazing temperature (Col. 2, line 66 – Col. 3, line 40).

It would be obvious to one of ordinary skill in the art to perform post-treatment (HIP treatment) of the plate stack at a gas pressure approximately 1200 bar, and at a post-treatment temperature below the prior brazing temperature, as taught by Beltran, for the purpose of precluding remelting of the braze alloy and disruption of seam integrity (Col. 3, line 2) and to obtain a desired bond by the interdiffusion of molecules across the interface between plates (Col. 3, line 38) and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

34. Re **Claim 18**, Matsumoto discloses a joining material is applied to surfaces of at least some openings (Col. 15, paragraph 90).

35. Re **Claim 19**, Matsumoto does not explicitly disclose the plate stack or the cooler formed by said plate stack is processed on at least one surface by diamond cutting. However, diamond cutting is a well known process and it would have been obvious for

one of ordinary skill in the art to perform diamond cutting, for the purpose of making a precise cut in hard metal.

36. **Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (EP 1136782A1) in view of Beltran (US 3,904,101), as applied to Claim 1, in further view of Woodfield (US 6,737,017).**

37. Re **Claims 8 and 9**, Matsumoto does not explicitly disclose that during the HIP post-treatment an inert gas atmosphere formed by argon or nitrogen with a maximum oxygen content is used that amounts to approximately 300% of the oxygen content corresponding to the equilibrium oxygen partial pressure at the treatment temperature (TB) or that the oxygen content in the inert gas atmosphere is less than an oxygen partial pressure of 15.times.10.sup.-6 bar.

However, Beltran teaches during the HIP post-treatment an inert gas atmosphere formed by argon or nitrogen with a maximum oxygen content is used (Col. 3, lines 12-40). It would be obvious to one of ordinary skill in the art to perform post-treatment (HIP treatment) of the plate stack with argon, as taught by Beltran, for the purpose of precluding remelting of the braze alloy and disruption of seam integrity (Col. 3, line 2) and to obtain a desired bond by the interdiffusion of molecules across the interface between plates (Col. 3, line 38). Further, **Woodfield** teaches a hot isostatic pressing method including a residual oxygen content which can diffuse into and alloy with the metallic component showing that it is beneficial to have a maximum oxygen content during an HIP step (Col. 11, lines 20-25). It would be obvious to ordinary skill in the art to have a maximum oxygen content during an HIP step, as taught by Woodfield, for the

purpose of achieving further alloying of a metallic article (Col. 11, line 21) and also since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

38. **Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (EP 1136782A1) in view of Beltran (US 3,904,101), as applied to Claim 1, in further view of Gaddis (US 2,726,681).**

39. Re **Claims 10-11**, Matsumoto discloses application or creation of a joining material on the plates made of metal (Col. 15, paragraph 90),
heating after stacking to a temperature above the melting point of the joining material (Col. 3, paragraph 12).

Matsumoto does not disclose using copper-oxide layer as the joining material and heating at a temperature between 1065 and 1083 degree C.

However, **Gaddis** teaches application of copper-oxide as a joining material to bond metal parts and heating to a desired temperature such that the copper oxide becomes fluid (Col. 3, lines 1-25). It would be obvious to one of ordinary skill in the art to utilize copper oxide, as taught by Gaddis, for the purpose of creating a mechanically strong bond having excellent heat transfer characteristics (Col. 3, line 19) and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Matsumoto does not disclose HIP post-treatment of the plate stack at a pressure

between 200 and 2000 bar or 1000 bar, and at a post-treatment temperature of at least 390.degree. C. and no more than 1052.degree C or 1020.degree. C.

However, **Beltran** teaches HIP post-treatment of the plate stack at a pressure between 200 and 2000 bar or 1000 bar, and at a post-treatment temperature below the prior brazing temperature (Col. 2, line 66 – Col. 3, line 40).

It would be obvious to one of ordinary skill in the art to perform post-treatment (HIP treatment) of the plate stack at a gas pressure between 200 and 2000 bar, and at a post-treatment temperature below the prior brazing temperature, as taught by Beltran, for the purpose of precluding remelting of the braze alloy and disruption of seam integrity (Col. 3, line 2) and to obtain a desired bond by the interdiffusion of molecules across the interface between plates (Col. 3, line 38) and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

40. **Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (EP 1136782A1) in view of Beltran (US 3,904,101), as applied to Claim 1, in further view of Surty (US 3,405,323).**

41. Re **Claims 15-16**, Matsumoto discloses application or creation of a joining material on the plates made of metal (Col. 15, paragraph 90),
heating after stacking to a temperature above the melting point of the joining material (Col. 3, paragraph 12).

Matsumoto does not disclose using gold as the joining material and heating at a

temperature between 880 and 1065 degree C or 1030 C.

However, **Surty** teaches application of gold as a joining material to bond metal parts by brazing (Col. 4, line 12). It would be obvious to one of ordinary skill in the art to utilize gold, as taught by Surty, for the purpose of creating a mechanically strong bond having excellent heat transfer characteristics and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Matsumoto does not disclose HIP post-treatment of the plate stack at and a pressure (PB) of 900 bar and a post-treatment temperature of at least 408.degree. C. and no more than 877.degree C or 920 C.

However, **Beltran** teaches HIP post-treatment of the plate stack at a post-treatment temperature below the prior brazing temperature (Col. 2, line 66 – Col. 3, line 40). It would be obvious to one of ordinary skill in the art to perform post-treatment (HIP treatment) of the plate stack at a gas pressure between 200 and 2000 bar, and at a post-treatment temperature below the prior brazing temperature, as taught by Beltran, for the purpose of precluding remelting of the braze alloy and disruption of seam integrity (Col. 3, line 2) and to obtain a desired bond by the interdiffusion of molecules across the interface between plates (Col. 3, line 38) and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

42. **Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (EP 1136782A1) in view of Beltran (US 3,904,101), as applied to Claim 1, in further view of Mundinger (US 5,727,618).**

43. Re **Claim 17**, Matsumoto does not discloses at least one electric component is fastened to the plate stack or to the cooler formed by the plate stack, by means of brazing, and the component is a laser diode or light-emitting diode.

However, **Mundinger** teaches brazing a diode 155 to a plate stack 160 (Fig. 7; Col. 9, line 35). It would be obvious to one of ordinary skill in the art to braze a diode to a plate stack, as taught by Mundinger, for the purpose of properly attaching the components together and enabling the diode to function with the heat exchanger.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RYAN J. WALTERS whose telephone number is (571)270-5429. The examiner can normally be reached on Monday-Friday, 9am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bryant can be reached on 571-272-4526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. J. W./
Examiner, Art Unit 3726

/DAVID P. BRYANT/
Supervisory Patent Examiner, Art Unit 3726